



UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
-----------------	-------------	----------------------	---------------------	------------------

10/500,798

07/07/2004

Sumio Iijima

2004_1057A

8290

513

7590

11/21/2007

WENDEROTH, LIND & PONACK, L.L.P.

2033 K STREET N. W.

SUITE 800

WASHINGTON, DC 20006-1021

EXAMINER

MCCRACKEN, DANIEL

ART UNIT

PAPER NUMBER

1793

MAIL DATE

DELIVERY MODE

11/21/2007

PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary

Application No.

10/500,798

Applicant(s)

IJIMA ET AL.

Examiner

Daniel C. McCracken

Art Unit

1793

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 06 September 2007.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 15-17 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 15-17 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
 - ☐ Certified copies of the priority documents have been received in Application No. _____.
 - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- ☒ Notice of References Cited (PTO-892)
- ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- ☒ Information Disclosure Statement(s) (PTO/SB/08)
Paper No(s)/Mail Date _____
- ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date _____
- ☐ Notice of Informal Patent Application
- ☐ Other: _____

DETAILED ACTION

Citation to the Specification will be in the following format (S. # : ¶) where # denotes the page number and ¶ denotes the paragraph number. Citation to patent literature will be in the form (Inventor # : LL) where # is the column number and LL is the line number. Citation to the pre-grant publication literature will be in the following format (Inventor # : ¶) where # denotes the page number and ¶ denotes the paragraph number.

Response to Arguments

Applicant's arguments and affidavits with respect to all claims are moot, as all previously pending claims have been cancelled. Accordingly, all rejections and objections mooted by cancellation are withdrawn. New rejections appear forthwith. The amendment to the specification will be entered. Figures 5 and 6 have been received. The objection to the drawings is withdrawn.

Claim Rejections - 35 USC § 112

The following is a quotation of the first paragraph of 35 U.S.C. 112:

The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

Claims 15-17 are rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the written description requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention. To the extent Applicants intend the "frustrum of pyramids" and "no space between

the layers” language to be limiting, this limitation was not described in the specification in a way that demonstrated possession of the claimed invention. While Applicants have submitted an affidavit, this affidavit only alleges that the graphene sheets are tightly arranged as opposed having “no spaces therebetween,” as required by the claims. The declaration supports the idea that onions have in fact been formed. As noted in the non-final office action of 4/6/2007, graphite has a space between layers. Experimental evidence (facts, not allegations) in appropriate affidavit format that conclusively shows no space between graphite sheets is necessary.

Claim Rejections - 35 USC § 103

The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office action.

The entire reference teaches each and every limitation of the rejected claims. The pinpoint citations provided are in no way to be construed as limitations of the teachings of the reference, but rather illustrative of particular instances where the teachings may be found.

Claims 15-17 are rejected under 35 U.S.C. 103(a) as being unpatentable over C. Journet, et al., *Production of carbon nanotubes*, 67 Appl. Phys. A 1 (1998) (hereinafter “Journet at __”) in view of Shunji Bandow, *Purification of Single-Wall Carbon Nanotubes by Microfiltration*, 101 J. Phys. Chem. B 8839 (1997) (hereinafter “Bandow at __”) and Iijima, et al, *Nano-aggregates of single-walled graphitic carbon nano-horns*, Chemical Physics Letters 1999; 309: 165-170 (hereinafter “Iijima at __”).

With respect to Claims 15-17, Journet discloses a method including the steps of laser ablation of a graphite target in an inert gas at a temperature above 1000 °C. *See generally* (Journet at 3, “2 Laser Ablation”). Journet generally directs the discussion towards carbon nanotubes, that is, it does not disclose *in haec verba* “graphite nanospheres.” Bandow however discloses that a laser ablation process necessarily produces the graphite nanospheres of the claimed invention. *Compare* (Bandow at 8839, Col. 1) (“In both the laser vaporization and electric arc methods for SWNT production, *a considerable (or even dominant) fraction of the carbon generated is in the form of sp^2 -bonded carbon nanospheres (CNS).*”) (citation omitted, emphasis added) *with* (S. 6, 4) (“The chemical bond may be a bond between sp^2 six-membered rings.”).

As to the pressure and gas limitations found in Claims 15-17, Journet discloses “This is not surprising since the experimental conditions depend on various parameters such as the metal concentration [5–24], *the inert-gas pressure, the nature of the gas* [25], the current, and the geometry of the system.” (Journet at 3, Col. 1.) (emphasis added). Further, Journet states “all the techniques described in this report reflect the current state of the art and *still need to be optimized.*” (Journet at 1, Col. 1) (emphasis added). To the extent Journet does not explicitly recite the claimed pressure limitation, “discovery of an optimum value of a result effective variable in a known process is ordinarily within the skill of the art.” *In re Boesch*, 205 USPQ 215, 219 (CCPA 1980) (citations omitted).

Clearly, the prior art teaches that pressure, temperature and gas are result-effective variables, the optimization of which does not impart patentability. To the extent neither Journet nor Bandow *may not* provide any teaching, suggestion or motivation to utilize the higher

pressure range as claimed, Iijima does. *See* (Iijima at 170, col. 1) ("when the Ar gas pressure increases, the graphite structure is well formed") (emphasis added).

Conclusion

Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Alternatively, Applicant's submission of an information disclosure statement under 37 CFR 1.97(c) with the fee set forth in 37 CFR 1.17(p) on 09/06/2007 prompted the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a), MPEP § 609.04(b). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

All amendments made in response to this Office Action must be accompanied by a pinpoint citation to the Specification (i.e. page and paragraph or line number) to indicate where Applicants are drawing their support.


Application/Control Number:
10/500,798
Art Unit: 1793

Page 6

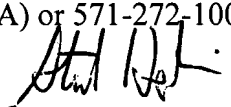
Any inquiry concerning this communication or earlier communications from the examiner should be directed to Daniel C. McCracken whose telephone number is (571) 272-6537. The examiner can normally be reached on Monday through Friday, 9 AM - 6 PM EST.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Stanley S. Silverman can be reached on (571) 272-1358. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.



Daniel C. McCracken
Assistant Examiner
DCM



Stuart L. Hendrickson
Primary Examiner